

Mission to Planet Earth Developments

Presentation to

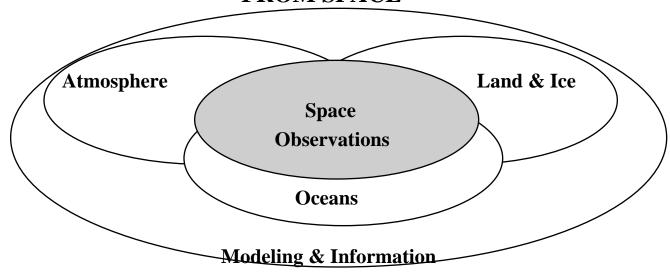
National Space Outlook Conference

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NASA'S UNIQUE CONTRIBUTION IS THE GLOBAL VIEW FROM SPACE



- Best way to study Earth as a whole is from space
- Satellites look at all parts of Earth- land, oceans, air and life and how they affect one another

They objectively compare regional and local environmental changes with the global "big picture"

• NASA's space research promotes domestic and international confidence in our understanding of the global environment



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THERE HAS BEEN GOOD PROGRESS

- A US/French oceanography satellite launched in 1992
 - is tracking El Nino weather events across the Pacific
 - is measuring global sea level changes
- In 1993, A NASA/Brazil Project
 - demonstrated ability of satellites to measure forest changes
 - deforestation rate less than previously thought
 - Brazil will monitor rain forest with US-built system
- In 1994, NASA results extended understanding of Antarctic "ozone hole"
 - NASA/NOAA measurements indicated ozone treaties are working
- In 1994, NASA launched the next generation weather satellite (GOES 8) and in 1995 launched GOES-9
- In 1994, the Shuttle twice carried into space the most advanced radar devoted to studying Earth's environment



...WITH MUCH MORE TO COME

- In 1995, a private company will launch a small spacecraft to provide NASA with important data on ocean plant life and to enable fishermen to improve their catch
- In 1995, NASA and Canada will begin the first comprehensive study of the Antarctic ice sheet from space
- In 1996, two small NASA spacecraft -- developed in two years -- will demonstrate cutting-edge technology, differentiate plant species, detect atmospheric pollution, and provide numerous commercial and government users with economically relevant information
- In 1997, a NASA/Japanese satellite will make the first precise measurements of tropical rainfall to improve climate predictions



First comprehensive study of interaction between atmosphere, oceans, land and life begins in 1998

- All the key elements of the Earth system will be observed together for the first time
- Provides a 15 year data set needed to discern cycles and trends
- Global data needed to make reliable climate forecasts
- A key issue is to relate global and regional/local processes
- Provides scientific, objective, <u>non-political</u> basis for environmental decisions
- EOS will provide data essential to forecasting the climate

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Understanding the individual parts of the climate system - and their interactions - will be valuable in the short-term

- Will there be floods or drought next year in my region?
- How does short-term climate change and land usage affect forest and agricultural productivity?
- How does the changing climate affect the biological productivity of our oceans?
- Will the sea level rise?

At first there will be one-year predictions, but as our data sets grow they will lengthen to 2, 3, 4 and more years

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Achieving the principal goal of the Global Change Research
Program = predicting the climate = will be highly significant

- Good predictions will mean the scientists have done their jobs
- Good predictions will stabilize a highly-charged debate
- Good predictions will help policymakers
- Good predictions will guide business planning and investment decisions

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- A priority during three administrations
 - Planned and designed during the Reagan Administration
 - A presidential initiative of the Bush Administration
 - Implementation continues in the Clinton Administration
- Implementation costs (through 2000) reduced by 60% since 1991
 - Vision of comprehensive measurements retained
 - System near minimum cost based on today's technology
 - Foreseeable innovations will reduce costs post-2000
- International collaboration has been and remains a foundation of the program since its inception
 - International partners will contribute \$1 billion in the pre-2000 period
 - NASA leadership helps America influence the global space2.pp@pp?ronmental agenda





EOS DATA AND INFORMATION SYSTEM (EOSDIS)

- Makes all Mission to Planet Earth data widely accessible
- Fosters integration of interdisciplinary Earth science community
- Encourages greater interaction between scientists and civil, policy, and practical users
- · Preserves knowledge base of data and research results

Evolution of EOSDIS

<u>Pre-EOSDIS</u>: data from each satellite, instrument and scientist independently captured, processed, and stored

- NASA's data holdings were too scattered
- Like the phone company without a phone book
- EOSDIS today: building one system to manage all NASA's Earth science data
 - Data system handles ground receiving stations, flight operations, data archive, and product distribution
 - Data system currently has approx. 360 data products from 40 past and present satellites
 - In the past year alone, NASA's data has been distributed to thousands of users
- <u>EOSDIS tomorrow</u>: Incorporates new commercial technologies and standards as they emerge and accomodates ever-broadening user base

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First Phase of EOS: Proceeding on Schedule

- Schedule represents careful balance between funding constraints and need for integrated climate change measurements
 - FY 1996 budget request is minimum needed to support Phase 1 with available technology
- Critical to fly this first phase of 24 measurement types as soon as possible, beginning with the first launch in 1998
- At least 15 years of continuous data for each of the 24 measurement types is essential to detect the signature of a changing climate





The Next Phases of EOS: An Evolving Program

- Committed to reducing costs in second and third phases of EOS by:
 - New technology in satellites, instruments, ground systems and operations
 - Stregthening ties to commercial, interagency, and international partners
- Evolution of EOS made possible by:
 - Rapid advances in technology since original EOS program began
 - » In addition, evolution in science requirements
 - Emerging area of commercial remote sensing
- NASA initiated study to examine how best to incorporate innovation
 - Examine ways to reduce size, power, and processing requirements
 - Must maintain data continuity and integrity
 - Will develop proactive strategy for next phases by end of summer
 - Study effort does not represent restructuring of Phase 1 program

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NASA Studies

EOS Reshaping Science Strategy EOSDIS Reshaping NASA/NOAA Alignment Commercial Dimensions International Dimensions



BSD Study July 19-29

Seasonal to Interannual Global Change Decadal to Centennial Global Change Atmospheric Chemistry Large-Scale Ecology Observational Strategy Data System



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Schedule

March 1995

• Initiation of NASA MTPE Evolution Study and NASA/
NOAA Roundtable

May 1995 • NASA Zero-base review (ZBR) decisions

June 1995 • EOS Investigator Working Group meeting

• JASON study on EOS technology infusion

• EOSDIS User Conference

July 1995
 NRC Workshop (including review of future EOS implementation and NASA/NOAA alignment)

New Millenium Workshop

August 1995
 NASA budget Decisions (input to President's FY97 budget)

September 1995 • Selection of EOS Common S/C contractor

Award of EOS Common S/C

July 1996 • Follow-up JASON and NAS Workshops

14 MTPE



NASA / NOAA Alignment Study

- <u>Purpose</u>: identify cost savings and service enhancements which could emerge from closer integration of NASA's and NOAA's programs in environmental observation and research
- <u>Structure</u>: Roundtable between NASA and NOAA senior officials will meet regularly to examine results of three working groups:
 - Collocation Synergy: exploring new approaches to research/ operations by taking advantage of collocation (proposed NOAA facility on GSFC East Campus)
 - Technology Infusion: exploring new/innovative ways to incorporate advanced technology from MTPE into NOAA's environmental weather satellite system
 - Data Systems Synergy: exploring innovative ways of using NASA and NOAA data systems to solve mutual problems more effectively

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Summary

- Significant progress is being made in EOS, EOSDIS and Science programs
- MTPE, along with the rest of the Agency, is beginning to implement the results of the Zero Base Review activity as recommendations are accepted
- However, this addresses the President's FY96 budget request, and represents only the most optimistic budget scenario
- As the results of budget deliberations and the various summer studies become known, the MTPE program could look signficantly different than it does today

